

*ENVIRONMENTAL ASSESSMENT  
AND  
SECTION 404 EVALUATION  
FOR*

**MAINTENANCE DREDGING**

**WELLFLEET HARBOR**

**WELLFLEET, MASSACHUSETTS**



*DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
WALTHAM, MASS.*

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## SUMMARY

It is the responsibility of the Corps of Engineers, New England Division, to maintain the Federally authorized navigation project in Wellfleet Harbor, Wellfleet, Massachusetts. It is also the responsibility of the Corps, in accordance with the National Environmental Policy Act and the Water Pollution Control Act, to investigate and present those effects associated with the project that impact the human environment and water resources -- and, where possible, minimize detrimental impacts. Various concerns regarding such impacts have resulted in the Corps proposing the project as described in this assessment to avoid more unacceptable environmental impacts, yet accomplish the needed maintenance of the navigation channel.

This final project design is the result of efforts by Federal and State concerns to determine an appropriate methodology for management of disposal activity at the project. This plan has been designed to minimize adverse environmental effects to the marine ecosystem.

Potential impacts and objectives of concern have been clearly identified in this assessment and considered in the project specifications. The proposed disposal method has been determined, within institutional, economic, and engineering constraints, to be the most suitable alternative to accomplish maintenance of this navigation project.

## I. PROJECT DESCRIPTION

The town of Wellfleet, in Barnstable County, Massachusetts, is located on the west side of the outer hook of Cape Cod. Wellfleet, which is eight miles long and three miles wide, serves as a natural harbor for commercial shellfishing and charter boat cruises, and offers an excellent marina and abundant facilities to accommodate tourists, vacationers, pleasure boaters, and recreational water users. The harbor itself is used as a commercial fishing port. It is a narrow embayment only three-quarters of a mile long containing a town pier, wharf with moorings and a boat ramp.

The authorized Federal navigation project at Wellfleet Harbor provides for a channel 10 feet deep at Mean Low Water (MLW) and 125 feet wide from deep water in the outer harbor extending about 0.8 miles northeast to the town landing and an anchorage basin of the same depth, 800 feet by 500 feet. (See Figure 1)

## II. PURPOSE AND NEED FOR ACTION

The Federal anchorage has shoaled to a depth of about 6.5 feet below Mean Low Water. The shoaling severely limits the use of Wellfleet Harbor by both commercial and recreational craft.

In 1977, nearly 900 tons of a commercial shellfish and finfish were landed at Wellfleet Harbor and charter fishing vessels carried over 13,000 passengers on fishing trips. About 170 recreational craft were permanently berthed in Wellfleet Harbor in 1976 and at least 100 additional requests for berths were on file. About 1800 craft used the boat launching ramp in the harbor in 1976 and at least 2,000 transient craft visited the harbor during that year. Failure to maintain the authorized depth of the harbor would lead to loss of benefits associated with commercial fishery and recreational boating. Tourism and commercial fishing are the summary sources of revenue for the town of Wellfleet, the economic health of the community is closely tied to the maintenance of adequate harbor facilities.

## III. ALTERNATIVES

### No Action

The no-action alternative would result in continued shoaling of the anchorage at Wellfleet Harbor, eventually causing severe economic loss to the community. Commercial fishermen, recreational boaters and tourists would shift their activities to other communities with viable harbor facilities, thus reducing revenues to Wellfleet.

### Alternate Methods of Disposal

The selection of the method of dredging is primarily dependent upon the availability of a suitable disposal site. Hydraulic dredging would be feasible if a suitable land disposal site were within reasonable pumping distance. However, two sites were investigated and found to be unsuitable.

The first site, a 15-acre privately owned parcel located off Cove Road, was deemed unacceptable by local concerns since placement of dredged material would result in an elevation increase of 10 feet.

A second site, on Indian Neck Point, was considered unacceptable for several reasons. First, it was questionable whether the site was large enough to receive the material. Second, the area is surrounded by productive shellfish beds that could be jeopardized if the dike surrounding the site were to be washed out by a winter storm. Finally, some local concern was expressed over the possibility that the material would be dispersed by winds and possibly wave action and result in filling in of Chipman's Cove.

Alternate open water disposal sites could be located, however, potential impacts associated with the use of other open water sites would be similar to those associated with the presently proposed sites. (See Figure 2)

### IV. PROBABLE IMPACTS

#### Dredging

Dredging will cause a temporary increase in turbidity which will in turn lower the amount of sunlight available for photosynthesis and stress marine organisms. This is considered to be a minor impact since studies by Bokuniewicz et al (1974) conducted at New Haven Harbor, Connecticut, where heavily silted material was removed by bucket dredge, have shown that less than 2.5 percent of the sediments were released into the water column. During this same study turbidity plumes and sedimentation patterns caused by clamshell dredge were compared to natural occurrences during winter storms and found to exceed natural levels only in a very narrow elliptical path extending a few hundred meters in the direction of the predominant current. This is the type of scenario expected to occur during the Wellfleet dredging and it should last only as long as dredging continues.

Sedimentation resulting from dredging activities has the potential to stress commercially valuable shellfish species found within the harbor area. In order to avoid this loss, shellfish will

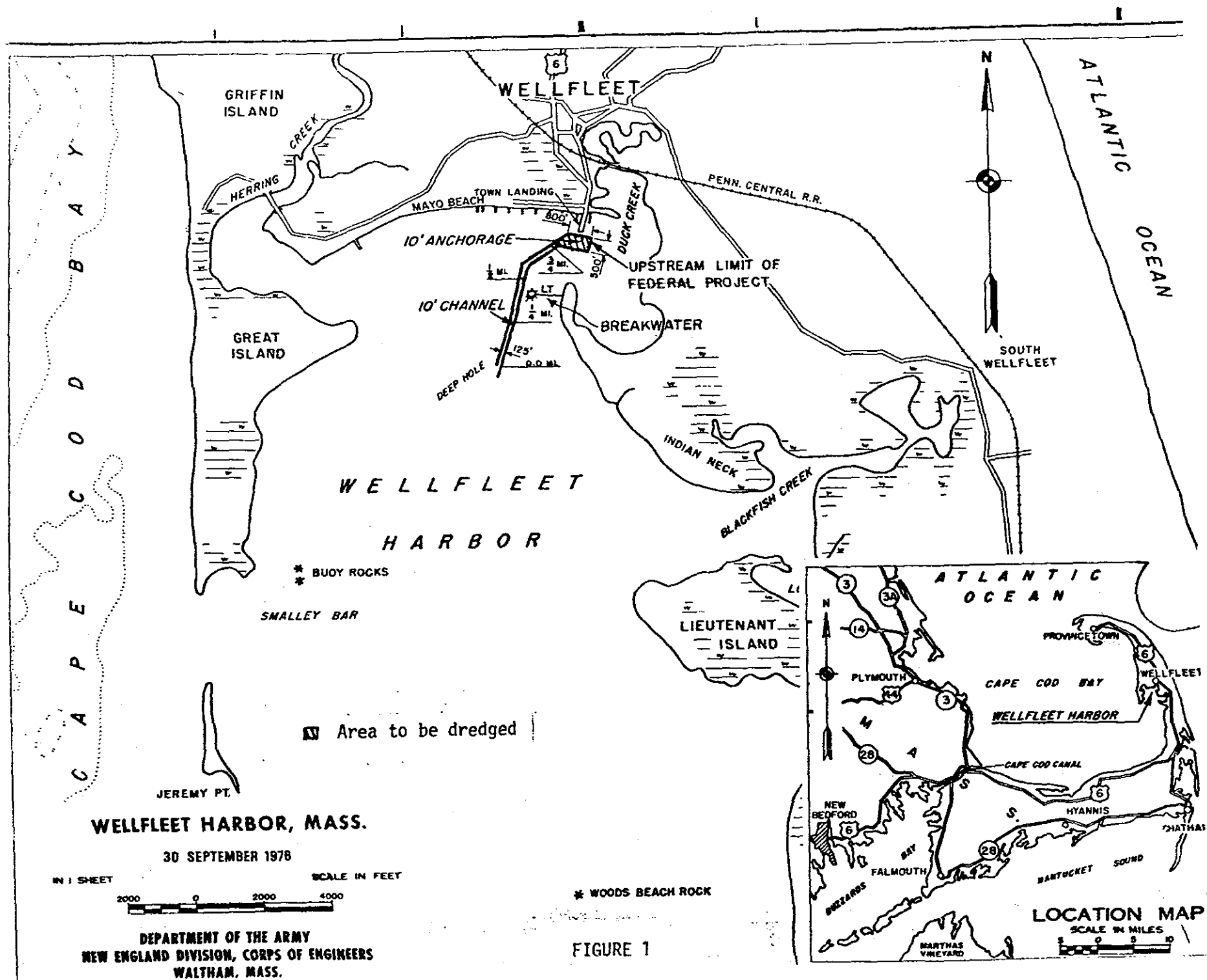
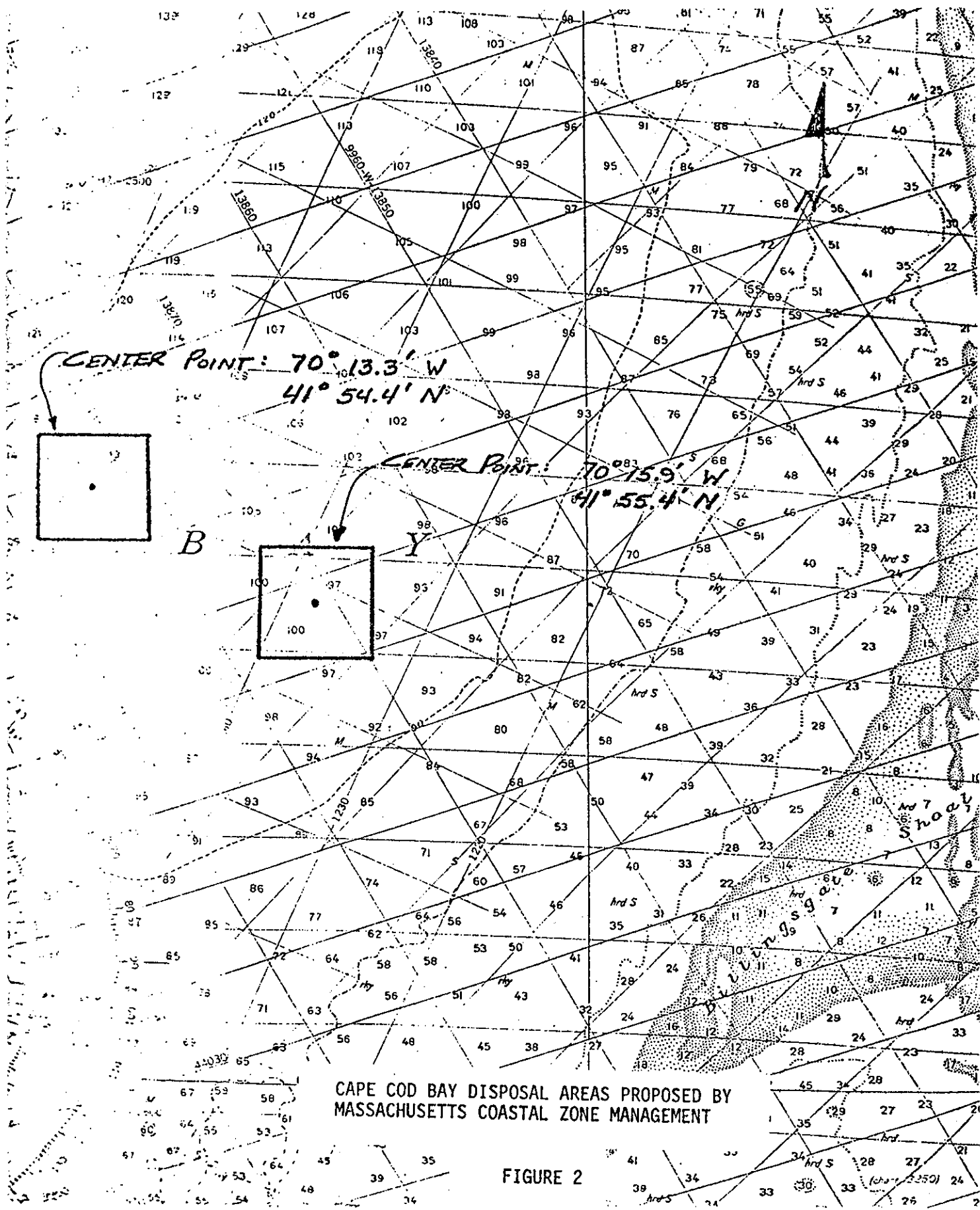


FIGURE 1



be removed from those areas likely to be impacted prior to any dredging. Those areas where shellfish will not be harvested are considered sufficiently removed from the dredging site so that suspended material will have been well diluted and disbursed. Studies by Bokuniewicz have also shown the amount of sedimentation associated with clamshell dredging to be equivalent to the amount which would accumulate during four winter storms. Massachusetts Coastal Zone Management, in their Review of Dredge and Spoil Disposal Practices in Massachusetts (December 1975), has concluded "Since ten or more storms occur in a typical season, dredging is not a significant perturbation on the natural environment of the harbor. In general, except in very severe cases, it is doubtful that dredge induced turbidity and sedimentation would exceed levels naturally induced." However, turbidity does temporarily reduce visual aesthetics. In areas extensively used for recreation, this situation is undesirable. Therefore, dredging has been scheduled for the spring to avoid conflict with increased summer harbor activity.

The release of heavy metals and nutrients is another concern related to dredging. Sediment samples were taken from six stations within the Federal project area in April 1978. Of these, five stations were analyzed and the results are presented in Table 1. Sediment samples for elutriate tests were also taken in December 1979. At the time of this writing lab analysis has not been completed. Test results will be made available to appropriate agencies and concerns prior to commencement of dredging at Wellfleet. However, it should be noted impacts directly attributable to the presence of those parameters tested are dependent on site-specific factors such as water temperature, salinity, pH and the form or species of metal. These variables cannot be predicted and no clear cut statements can be made on potential impacts, but it is felt tidal flushing will quickly dilute any increased concentrations to ambient levels. It is also thought that if these chemicals are present in the sediment and naturally high levels of turbidity exist in Wellfleet Harbor, the biota presently inhabiting the area is acclimated or unaffected by this stress.

The most direct biological impact of dredging will be the removal of those organisms in the immediate work area. Mobile species such as finfish and crustaceans will avoid the area. For those slow moving organisms that will be destroyed, repopulation by a similar community should commence shortly after dredging ceases, with neighboring communities providing larva that may settle in the dredge area.

TABLE 1

Bottom Sediment Analysis, Wellfleet Harbor  
Wellfleet, Massachusetts

<u>Parameter Tested</u>	<u>Station 1</u>	<u>Station 2</u>	<u>Station 3</u>	<u>Station 4</u>	<u>Station 5</u>
Visual Classification	M-F Sandy Organic Clay	M-F Organic Clayey Silt	Fine Sandy Organic Clayey Silt	Fine Sandy Organic Silt	Fine Sandy Organic Clay
Grain Size - Median	0.045	0.0215	0.0051	0.0185	0.009
Grain Size Curve - % Fine	59.0	83.70	93.0	88.50	83.50
Liquid Limit	128	169	242	211	180
Plastic Limit	58	59	82	80	81
Spec. Grav. Solids	2.57	2.55	2.45	2.52	2.49
Percent Solids	72.00	29	21.00	26.00	25.00
% Vol. Solids - EPA	1.43	12.1	19.0	14.6	16.8
- NED	1.27	11.2	17.7	13.5	15.5
% Total Vol. Solids - EPA	-	-	-	-	-
C.O.D.	15,000.0	160,000.0	233,000	180,000	200,000.0
Total KjDL Nit.	510.0	5,100.0	10,500.0	7,000.0	7,000.0
Oil and Grease	200.0	1,200.0	6,100.0	2,500.0	5,500.0
Mercury	0.2	0.3	0.4	0.2	0.2
Lead	5.0	31.0	68.0	15.0	48.0
Zinc	8.0	100.0	110.0	83.0	82.0
Arsenic	1.0	11.0	31.0	9.0	18.0
Cadmium	2.0	5.0	7.0	8.0	6.0
Chromium	2.0	3.0	44.0	37.0	42.0
Copper	6.0	29.0	40.0	33.0	30.0
Nickel	7.0	27.0	24.0	20.0	26.0
Vanadium	6.0	53.0	130.0	110.0	120.0

All values expressed as ppm unless otherwise noted.

### Disposal

Bioassay tests were performed in order to determine the environmental acceptability of disposing of Wellfleet sediments at the proposed open water site. These tests expose sensitive marine organisms to sediments from the project site and compare survival of these organisms to survival of organisms exposed to a clean control sediment. There are three phases to the bioassay test - liquid, suspended particulate and solid, with results of the solid phase testing considered the most important.

Results of all three phases of the test showed no significant statistical difference in survival of organisms exposed to Wellfleet Harbor sediments and control sediments. Therefore, open water disposal of Wellfleet Harbor sediments is judged to be ecologically acceptable.

### V. AFFECTED ENVIRONMENT

The town of Wellfleet, in Barnstable County, Massachusetts, is located on the west side of the outer hook of Cape Cod. Wellfleet Harbor itself is an indentation, .75 miles long, located midway along the east side of Cape Cod Bay, approximately 12 miles southeast of Provincetown Harbor and 108 miles from Boston Harbor. Harbor facilities include a town pier and wharf along with moorings and a boat launching ramp.

### Economics

Today, the town of Wellfleet, like other towns of Cape Cod is principally a resort community. In 1975, 81 firms were reported by the Massachusetts Division of Employment Security. Only one manufacturing firm was reported, the rest being dominated by retail trade and service industries. The commercial fishing industry also provides substantial stimulus for the town's economy. Eighteen fishing boats with drafts up to 8 feet operate out of Wellfleet Harbor and are engaged in sea scalloping, drag fishing and quahogging.

A large recreational fleet, including charter sport fishing vessels, is also located at Wellfleet. Approximately 170 craft, ranging in size from small outboards to cruisers can be found here. In 1975, approximately 2000 vessels used the boat launching ramp and a total of 19,400 vessel trips were recorded. The use of Wellfleet Harbor facilities generated a revenue of \$43,100 for the town. A breakdown is summarized in Table 2.

TABLE 2

## Summary of Harbor - Derived Revenue in 1976

Facility	Fee	Number of Boats	Total
Boat Launching Ramp	\$2.00	1,800	\$3,600
Berth - Outboard Slips	150.00	78	11,700
Berth - Slips Over 20 Feet	300.00	86	25,800
Mooring Tags	10.00	2,000	2,000
			<u>\$43,100</u>

Water Quality

The water quality of Wellfleet Harbor has been designated "SA" by the Commonwealth of Massachusetts, Water Resources Commission, Division of Water Pollution Control. This classification is given to waters that are suitable for bathing, other water contact activities and shellfish harvesting. Such waters have the highest aesthetic value and are excellent fish and wildlife habitat.

Land Uses

A high percentage of land in Wellfleet has been designated as conservation land and, as such, development in these areas is restricted. One such area is the Wellfleet Bay Wildlife Sanctuary, which is a 700 acre parcel of land maintained by the Massachusetts Audubon Society. In addition, approximately 1,400 acres of wetlands in Wellfleet are under the jurisdiction of the Massachusetts Wetlands Protection Laws which prohibits most alterations to wetland areas. Of this, approximately 993 acres are salt marsh surrounding Wellfleet Harbor.

The town of Wellfleet itself has shown a one-third population increase between 1960 and 1970. While this growth rate is quite high, development pressures are low relative to other towns on Cape Cod. This is thought to be attributable to lack of accessibility and strong planning to control growth.

Fisheries

In a study undertaken in 1969 by the Division of Marine Fisheries, 35 species of finfish were recorded in Wellfleet Harbor. Anadromous fish such as alewife and blueback herring are known to migrate up Herring Creek each spring. The surrounding salt marshes provide excellent habitat for spawning and feeding while also serving as a nursery area. The finfish population is composed both of those species found year round in Wellfleet Harbor, such as Atlantic

silverside, fourspine and threespine sticklebacks, mummichog, and, seasonal visitors such as grubby, northern searobin, windowpane flounder, and northern puffer. Adventurous visitors include cod, Atlantic herring, bluefish, mackerel, smooth dogfish, little skate, and winter skate. Table 3 provides a list of those species identified in Wellfleet Harbor.

### Shellfish

Wellfleet Harbor provides an abundant shellfish resource for both commercial and recreational fishermen. The area supports quahogs, oysters, soft-shell clams and a small population of bay scallops.

Approximately 3000 acres of subtidal flats are harvested for quahogs. Wellfleet Harbor is on the perimeter of the quahogs' range and is the northern most area that supports a continuously active commercial fishery.

Oysters are generally not found north of Cape Cod because of cool water temperatures. But in the Wellfleet area, the large intertidal flats provide suitable temperatures in the warmer months of the year. However, in the winter months, oysters are subject to freezing temperatures and heavy ice that periodically cause large mortalities.

In 1960, soft shell clams were taken commercially from Wellfleet Harbor for the first time in 20 years. The major area of commercial fishing is along the shore of Blackfish Creek just south of Drummers Cove. Large concentrations on both sides of the creek are found in a narrow band close to the marsh edge. Limited clamming also takes place along the southeast shore of Lieutenant Island.

Bay scallops are occasionally important to the Wellfleet shell fishery but harvesting is sporadic at best since conditions in the harbor are not ideal.

TABLE 3

Common and Scientific Names of Fish Taken or  
Observed from Wellfleet Harbor, 1968-1969

smooth dogfish	<i>Mustelus canis</i>
little skate	<i>Raja erinacea</i>
winter skate	<i>Raja ocellata</i>
American eel	<i>Anguilla rostrata</i>
Blueback herring	<i>Alosa aestivalis</i>
alewife	<i>Alosa pseudoharengus</i>
Atlantic menhaden	<i>Brevoortia tyrannus</i>
Atlantic herring	<i>Clupea harengus</i>
goosefish	<i>Lophius americanus</i>
Atlantic cod	<i>Gadus morhua</i>
Atlantic tomcod	<i>Microgadus tomcod</i>
mummichog	<i>Fundulus heteroclitus</i>
striped killifish	<i>Fundulus majalis</i>
tidewater silverside	<i>Menidia beryllina</i>
Atlantic silverside	<i>Menidia menidia</i>
fourspine stickleback	<i>Apeltes quadracus</i>
threespine stickleback	<i>Gasterosteus aculeatus</i>
northern pipefish	<i>Syngnathus fuscus</i>
white perch	<i>Morone americana</i>
striped bass	<i>Morone saxatilis</i>
bluefish	<i>Pomatomus saltatrix</i>
mackerel scad	<i>Decapterus macarellus</i>
scup <i>Stenotomus chrysops</i>	
northern kingfish	<i>Menticirrhus saxatilis</i>
canner	<i>Tautoglabrus adspersus</i>
tautog	<i>Tautga onitis</i>
Atlantic mackerel	<i>Scomber scombrax</i>
northern searobin	<i>Prionotus carolinus</i>
striped searobin	<i>Prionotus evolans</i>
grubby	<i>Myoxocephalus aeneus</i>
lumpfish	<i>Cyclopterus lumpus</i>
windowpane	<i>Scophthalmus aquosus</i>
winter flounder	<i>Pseudopleuronectes americanus</i>
northern puffer	<i>Sphoeroides maculatus</i>
ocean sunfish	<i>Mola mola</i>

### Disposal Site

On 26 October 1977, a survey was made of the previously used disposal area in Cape Cod Bay for Wellfleet Harbor dredged materials. This area was last used in 1971 when approximately 68,000 cubic yards of material was disposed of.

The site is located between Billingsgate Shoal and Fishing Ledge, in waters ranging in depth from 60 to 108 feet. The seafloor substrate of Cape Cod Bay in this particular location is comprised of 20-40% clay and 60-80% silt with an organic carbon content of 1-2% (Schlee et al, 1973). The bottom topography is described as being smooth with little relief. Bathymetric surveys run by the Corps' Manomet will be completed prior to dredging or disposal to confirm the low relief and fine grain nature of sediments at this site. Cape Cod Bay has also been divided into two ecological zones based on sediment texture and associated invertebrate fauna (Young and Rhoads, 1971; Young et al, 1971). The Wellfleet disposal ground lies within "Zone I" which is defined as that area ". . . generally deeper than 15-20 meters . . ." and consisting of sediments comprised of "more than 20% mud."

A sampling grid was established using Loran-A navigation lines. Eleven sampling stations were made within the grid. The twelfth station was located in "Lumpkins Hole," an elongated shallow depression (39-45 feet) located along the southwestern tip of Billingsgate and near Bell Buoy 1. This location was recommended by some fishermen as a possible alternative disposal site and so was included in the survey.

Benthic grabs were made at all twelve stations with duplicate samples being obtained at Stations 1, 5, 6, 7, 10 and 12. Additional grabs were made at Stations 1, 3, 5, 6, 10, 11 and 12 to collect bottom sediments for physical and chemical analyses. The bulk chemical tests were performed in accordance with EPA's manual on "Methods for Chemical Analyses of Water and Wastes" (1974). All sampling was accomplished using a Shipex grab. The benthic samples were washed through a #30 sieve and the organisms retained, identified and counted.

The results of the bulk chemical sediment analyses are summarized in Table 4. The dominance of organic clays at those stations beyond the 90 ft. depth contour agrees with the findings of the earlier mentioned reports. The medium-fine sands associated with the clay muds at Station 3 may represent materials deposited from previous dredged disposal operations or simply a localized exposed area of underlying glacial deposits. Additional samples would be required to verify the actual source. Station 11 appears to be

TABLE 4

SEDIMENT ANALYSIS FROM WELLFLEET  
DISPOSAL AREA, CAPE COD BAY

PARAMETER VIS. CLASSIF.	SAMPLE STATION NUMBER						
	STATION 1 ORGANIC CLAY	STATION 3 M-F SANDY ORGANIC CLAY	STATION 5 FINE SANDY ORGANIC CLAY	STATION 6 ORGANIC CLAY FINE SAND	STATION 10 MED GRAY SAND W/SHELL	STATION 11 SANDY ORGANIC CLAY	STATION 12 LT. BROWN M-F SAND W/SHELL
Grain Size-Median	0.022	0.040	0.063	0.093	0.70	0.070	0.41
Grain Size Curve - % Fine	76.2	75.4	59.3	39.8	3.0	53.1	2.0
Liquid Limit	89	75	53	45	NP	57	NP
Plastic Limit	37	33	27	26	NP	26	NP
Spec. Grav. Solids	2.66	2.65	2.67	2.65	2.66	2.63	2.66
Percent Solids	44.54	53.74	58.27	64.5-	78.44	53.81	82.08
% Vol. Solids - EPA	6.57	5.19	3.96	3.01	1.16	4.42	0.68
- NED	4.51	3.67	2.81	2.26	0.7	3.30	0.33
% Total Vol. Solids - EPA	8.50	6.89	5.32	4.63	2.29	6.10	1.70
C.O.D.	71,600	56,800	41,000	33,800	9,890	48,800	3,870
Total KJDL Nit	3,453	2,440	1,768	1,240	340	2,040	460
Oil and Grease	820	740	390	310	230	800	120
Mercury	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Lead	40.3	29.8	27.5	24.8	<10	29.7	<10
Zinc	79.0	62.5	39.8	41.6	11.7	56.5	3.3
Arsenic	6.1	3.0	2.1	2.6	1.5	3.2	2.4
Cadmium	2.3	1.5	0.7	1.2	<0.5	0.7	<0.5
Chromium	51.7	30.7	27.4	27.9	7.6	33.5	2.0
Copper	18.0	14.9	10.3	12.4	2.5	14.9	2.0
Nickel	26.9	22.3	<10.0	14.9	<10	<10	<10
Vanadium	62.9	74.4	34.3	31.0	10.2	37.2	<10

located in a transition zone where the clay-silt muds grade into coarser grain material. The sand and shell deposits at Stations 10 and 12 are typical substrate characterizing the nearshore zone out to 60-70 feet.

The number of benthic species for the twelve stations sampled ranged from 7 to 36. Numbers of individual species were low and there was a conspicuous absence of amphipods at most locations. A complete species inventory by station is given in Table 3. The small deposit-feeding bivalve Nucula tenuis (identification questionable, may be N. delphinodonta) was found at all stations sampled except 12. The deposit-feeding polychaetes Ninoe higripes and Mediomastus ambiseta were taken at eight stations. Several other species of polychaetes including Pholoe minuta, Exogone hebes, Scoloplos robustus, Paraonis gracilis, Cossura longicirrata, Prionospio steemstruipi and Aricidae catherinae together or individually dominated numerically. The tubeworms Maldane sarsi and Clymenella torquata were especially abundant at Stations 4 and 10 respectively. Commercially important shellfish species were limited to a single soft-clam Mya at Station 8 and an ocean quahog Arctica at Station 1. Twenty-one juvenile sea-clams Spisula were taken at Station 12 and a commercial fishery for this species exists over the nearshore sandy bottoms. Station 12 exhibited a much more diverse fauna than the other stations but this is because it is shallower, characterized by coarser sediments and subject to tidal current and wind-generated turbulence. A variety of bivalves, gastropods, and sand-dollars comprise the community structure at this location.

All materials should be placed beyond the 90 ft. depth contour. Any materials dumped on the bottom within the 70 ft. depth contour will be subject to erosion and transport by existing tidal flow and wind-generated currents. Also, a sea clam population supports a commercial dredge fishery inside the 70 foot contour.

Lumpkins Hole should not be utilized for disposal as sea clams and quahogs are dredged from the hard sandy bottoms surrounding this site and there is considerable sport fishing in and around the adjacent shoals.

The organic clay and sandy organic clays of Stations 1, 4, 5 and 6 in Wellfleet Harbor are compatible in grain size to existing sediments at the proposed disposal area.

The resident benthic community structure at the proposed disposal area is comprised primarily of opportunistic deposit feeders (Grassle and Grassle, 1974) and the high density of polychaete tubes (i.e., Euchone, Spio, Ninoe, Maldane) will insure rapid colonization and subsequent stability of newly introduced sediments.

There are no commercially important shellfish in the proposed disposal area, that is, the area beyond 90 ft. that were sampled.

Based on known geological and biological characteristics of the site, this area should be considered as a containment site. The site has yet to be formally designated by the Commonwealth of Massachusetts.

If the site is designated for disposal purposes, it should be marked with a buoy for point-dumping. The buoy should be removed after disposal activities cease.

#### VI. COORDINATION

This project is being planned by the Corps of Engineers in cooperation with other Federal, State and local concerns. Coordination has included meetings as well as verbal and written communications.

A public notice was issued on 19 December 1979 describing the proposed plan of action. Public comments were solicited in this notice. All comments received will be addressed on an individual basis. However, comments received may warrant issuing a supplement to this assessment in order to properly address areas of debate.

## VII. REFERENCES

- Bokuniewicz, H., J.A. Gerbert, R.B. Gordon, P. Kaminsky, C.C. Pilbeam and M.W. Reed. Environmental Consequences of Dredge Spoil Disposal in Long Island Sound, Phase II; Geophysical Studies, November 1973 - November 1974. Department of Geology and Geophysics, Yale University, New Haven, Connecticut 06520.
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### FINDING OF NO SIGNIFICANT IMPACT

The proposed project involves restoring authorized dimensions to the Federal anchorage at Wellfleet Harbor, Wellfleet, Massachusetts. Approximately 70,000 c.y. of organic silty clay materials would be removed by clamshell dredge and disposed of at an open water site in Cape Cod Bay which has been approved by Massachusetts Coastal Zone Management for one-time use in conjunction with the proposed dredging.

The following considerations were weighed in the decision to prepare an Environmental Assessment as opposed to an Environmental Impact Statement:

- . Safe boating conditions can be restored by removing a relatively small amount of material (70,000 c.y.) from the Federal anchorage.
- . Valuable commercial shellfish beds in the harbor will be dragged prior to dredging to avoid potential stress or mortalities.
- . Dredged sediments will compliment those at the disposal site in terms of grain size, thus providing the same type of substrate for recolonization.
- . Except for vanadium, all parameters tested fall within Class II values for sediments as described in the New York - Connecticut Interim Plan for the Disposal of Dredged Material in Long Island Sound. These guidelines allow for open water disposal of Class II sediment without capping.
- . Bioassay tests showed no statistically significant difference in survival or organisms exposed to Wellfleet Harbor sediments compared to those exposed to clean reference sediments. These results indicate open water disposal is environmentally acceptable.

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DATE

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Colonel, Corps of Engineers  
Division Engineer

SECTION 404 EVALUATION

FOR

MAINTENANCE DREDGING OF WELLFLEET HARBOR  
WELL FLEET, MASSACHUSETTS

DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
WALTHAM, MASSACHUSETTS

Section 404(b) Evaluation  
for  
Maintenance Dredging of Wellfleet Harbor  
Wellfleet, Massachusetts

1. References.

- a. Section 404(b) of Public Law 92-500, Federal Water Pollution Control Act.
- b. 40 CFR 230.4 - 230.5 dated 5 September 1975.
- c. EC 1105-2-90 Appendix C, dated 8 May 1979.

2. The Proposed Project.

The proposed action involves removal of approximately 70,000 c.y. of sandy organic silts and clays by clamshell dredge from the authorized Federal anchorage basin. Dredging would restore the authorized 10 foot depth Mean Low Water (MLW) to the Federal anchorage which has an area of 800 feet by 500 feet.

Disposal of dredged material would occur at one of two possible sites in Cape Cod Bay located at 70° 15.9'W, 41° 55.4'N and 70° 13.3'W, 41° 54.4'N that have been approved on a one-time basis for use during dredging of Wellfleet Harbor.

3. Project Action.

The existing Federal project at Wellfleet Harbor was authorized by the River and Harbor Act of March 2, 1945 (H. Doc. No. 557, 76th Congress, Third Session).

4. Environmental Concerns.

Major areas of concern identified in conjunction with the proposed dredging of Wellfleet Harbor include:

- avoiding potential large scale loss of commercially important shellfish resources by insuring local concerns are notified of the intent to proceed in time to drag those areas likely to be impacted.
- scheduling the proposed dredging to avoid interference with shellfish reproductive processes or stressing sensitive juvenile forms.
- buoying the disposal site to insure the smallest practicable area is directly impacted by disposal activities.

The project, as proposed, addresses these concerns and minimizes potential impacts to the extent practical.

5. Technical Evaluation.

A technical evaluation with respect to disposal of dredged material and potential environmental impacts resulting from such disposal has been completed. The results are presented on page 4. Concomitant reading of or adequate familiarity with Section 404(b) Guidelines will insure understanding of results presented in the technical evaluation.

6. Conclusions.

Determinations

a. An ecological evaluation has been made following the evaluation guidance in 40 CFR 230.4, in conjunction with the evaluation considerations in 40 CFR 230.5.

b. Appropriate measures have been identified and incorporated in the proposed plan to minimize adverse effects on the aquatic environment as a result of the discharge (See Environmental Assessment for Maintenance Dredging of Wellfleet Harbor, January 1979).

c. Consideration has been given to the need for the proposed activity, the availability of alternate sites and methods of disposal that are less damaging to the environment, and such water quality standards as are appropriate and applicable by law.

d. Discharge of dredged material into wetlands will not occur. The proposed disposal site will be one of two open water sites located in Cape Cod Bay, which the Massachusetts Coastal Zone Management Office has indicated are acceptable for receiving fine-grain dredged material.

Findings

The discharge site for the maintenance dredging of Wellfleet Harbor, Wellfleet, Massachusetts, has been specified through the application of Section 404(b) Guidelines.

The project files and Federal regulations were reviewed to properly evaluate the objectives of Section 404 of Public Law 92-500. A public notice with respect to the 404 Evaluation and Environmental

Assessment was issued on December 19, 1979. Based on the information presented in both the Technical Evaluation and Environmental Assessment, I find that the project will not result in unacceptable impacts to the environment.

29 January 1980  
DATE

Max B. Scheider  
MAX B. SCHEIDER  
Colonel, Corps of Engineers  
Division Engineer

## Technical Evaluation

### 230.4-1 Physical and Chemical-Biological Interactive Effects

#### (a) Physical Effects (1 through 3)

##### (1) Effects on Wetlands

Dredging is expected to result in some siltation along adjacent wetland shorelines as fine grain sediments settle out of the water column. This will be a temporary condition and may not be significantly greater than the ambient estuarine conditions at Wellfleet Harbor.

Disposal activities will take place at an open water site and will not impact on any wetlands.

##### (2) Effects on the Water Column

Both dredging and disposal activities will result in increased turbidity, a reduction in light transmission, release of offensive gases and toxic chemicals that may cause direct destruction of nektonic and planktonic populations, and reduced aesthetic values. These conditions will be temporary, lasting only as long as dredge/disposal activities continue. The release of potentially harmful substances into the water column should have minimal, if any, effect since concentrations would be diluted to ambient levels fairly rapidly. Tidal flushing would also help dilute and disperse any contaminants.

##### (3) Effects on Benthos

Dredging is expected to destroy those benthic organisms inhabiting the immediate work area. Commercially valuable shellfish beds will be dragged before dredging begins to avoid their potential loss.

Most organisms at the disposal site are expected to be destroyed by burial. Since the particle size of both dredged material and disposal site sediments is comparable, repopulation by the same community is expected and should commence shortly after disposal activities cease.

#### (b) Chemical-Biological Interactive Effects (1 through 3)

(1) Evaluation of Chemical-Biological Effects

Dredged material from Wellfleet Harbor does not meet conditions specified in paragraphs (b) (1)(i), (ii) or (iii) of this section. Consequently, evaluation procedures specified in paragraphs (b)(2) and (3) must be addressed.

- (i) Dredged material is not predominantly composed of sand, gravel or any other naturally occurring sedimentary material with particle sizes larger than silt that would be characteristic of and generally found in areas of high current or wave energy.
- (ii) Dredged material is not suitable for and will not be used for beach nourishment or restoration.
- (iii)(a) Dredged material is substantially the same as the substrate at the disposal site in terms of particle size.
- (b) The site from which dredged material is to be taken is not considered sufficiently removed from sources of pollution to provide reasonable assurance that such material has not been contaminated.
- (c) Sound engineering techniques and disposal in an area that is considered a containment site will help insure that material will not be moved by currents or otherwise, in a manner that is damaging to the environment outside the disposal site.

Bioassay test results also indicate that open water disposal of Wellfleet sediments is environmentally acceptable.

(2) Water Column Effects

Both dredging and disposal will result in increased turbidity and some release of heavy metals to the water column. No significant impact to the water column is expected since tidal flushing and dispersion should quickly dilute all constituents to background levels.

(3) Effects on Benthos

Bioassay tests were conducted in November 1979 using Wellfleet Harbor sediments. Statistical analyses of test results showed no significant difference in survival of benthic organisms exposed to Wellfleet sediments as compared to a clean reference sediment during the solid phase testing. Based on these results open water disposal is considered ecologically acceptable.

(c) Procedure for Comparison of Sites (1 and 2)

- (1) Chemical analysis of sediments from the area where disposal will occur was completed in October 1977. Sediment analysis for Wellfleet Harbor was also done in 1977. Comparison of these test results showed Wellfleet sediments contain higher concentrations of virtually every parameter tested. However, specific cause - effect statements based solely on constituent concentrations are not usually made. Factors which cannot be predicted, such as form or species of the constituent, water temperature, pH and salinity influence the severity of potential impacts.
- (2) Analysis of the biological community in Cape Cod Bay near the proposed disposal site was completed in October 1977. Results show the area to be composed primarily of opportunistic deposit feeders. It is thought that this type of community will re-establish itself at the disposal site soon after disposal activities cease.

230.4-2 Water Quality Considerations

The proposed discharge will not violate any appropriate or legally applicable water quality standards.

230.5 Selection of Disposal Sites and Conditioning of Discharges of Dredged or Fill Material

(a) General Considerations and Objectives (1 through 8)

- (1) Discharge activities should not cause significant disruption to the chemical, physical or biological integrity of the aquatic ecosystem.

- (2) Discharge activities will not significantly disrupt the food chain nor alter or decrease diversity of plant and animal species.
  - (3) Discharge activities should not inhibit the movement of fauna, especially their movement into and out of feeding, spawning, breeding or nursery areas.
  - (4) Not applicable. Open water disposal in Cape Cod Bay will not impact any wetlands.
  - (5) Discharge activities will not destroy or isolate areas that serve the function of retaining natural high waters or flood waters.
  - (6) To the extent possible, adverse turbidity levels resulting from the discharge of dredged material will be minimized by the use of sound engineering techniques.
  - (7) Discharge activities will temporarily degrade aesthetic values at the disposal site. No known recreational uses occur in this area that might be affected. Economic values in the harbor are expected to increase by providing a safe usable anchorage for commercial fishing and recreational vessels while those at the disposal site would not be affected either adversely or positively.
  - (8) Degradation of water quality will be avoided through application of Sections 230.4, 230.5 (c) and (d).
- (b) Considerations Relating to Degradation of Water Uses at Proposed Disposal Sites (1 through 10)
- (1) Municipal Water Supply Intakes
 

Not applicable. No public water supply intakes are located in or near either of the proposed disposal sites.
  - (2) Shellfish (i through iv)
    - (i) A survey in the vicinity of the proposed disposal areas shows the sites support little in the way of shellfish populations.

- (ii) Both of the disposal sites are considered sufficiently removed from productive shellfish beds that movement of pollutants into such areas by currents or wave action will be minimal.
  - (iii) Disposal activities will not cause changes in current patterns, salinity patterns or flushing rates that might affect shellfish.
  - (iv) Disposal operations will be scheduled to avoid interference with reproductive processes and undue stress to juvenile forms of shellfish.
- (3) Fisheries (i through iii)
- (i) Disposal activities should not cause significant disruption of fish spawning or nursery areas.
  - (ii) While disposal operations are not expected to interfere with fish spawning cycles or migration patterns and routes, increased turbidity levels from dredging may interfere with anadromous fish migration in Herring Creek. However, it is thought the distance to the entrance to Herring Creek from the dredged area (approximately 1/2 mile), natural dilution and dispersion and tidal flushing would minimize any increased levels of turbidity.
  - (iii) Discharge activities will not significantly disrupt areas of submersed or emergent vegetation.
- (4) Wildlife
- Disposal activities will have no significant impact on the habitat, food chain or community structures of wildlife and marine or aquatic sanctuaries. Bioassay tests results indicate the environmental acceptability of disposal of Wellfleet Harbor sediments in Cape Cod Bay, which has been designated as an ocean sanctuary by the State of Massachusetts.
- (5) Recreation Activities (i through iv)
- (i) Reasonable methods will be employed to minimize any increase in amount or duration of turbidity which might reduce the numbers and diversity of

fish or cause a significant aesthetically displeasing change in the color, taste or odor of the water.

(ii) Release of dredged material is not expected to result in eutrophication at either of the disposal sites. Aesthetic values will be reduced until disposal activities are finished. No known recreational values are attributed to either of the proposed disposal sites.

(iii) Dredged material does not contain unacceptable levels of pathogens nor will it be released in an area used for recreation involving physical contact with the water.

(iv) Dredged material does not contain harmful quantities of oil and grease as defined in 40 CFR 110.

(6) Threatened and Endangered Species

No known threatened or endangered species inhabit the project area nor would the proposed project modify critical habitat of any species in such a way as to jeopardize the continued existence of that species.

(7) Benthic Life

Benthic organisms inhabiting the disposal site are expected to be destroyed by discharge of dredged material. However, repopulation by the same community is expected to commence shortly after disposal activities cease.

(8) Wetlands (i and ii)

(i) Not applicable. Discharge of dredged material into wetlands will not occur. Both of the proposed disposal sites are open water sites in Cape Cod Bay.

(ii) Not applicable. The project does not involve the discharge of fill material.

(9) Submersed Vegetation

Not applicable. There is no significant submersed vegetation in or near either of the proposed disposal sites.

(10) Size of Disposal Site

Point dumping at a buoyed site within the disposal area will help insure the smallest practicable area is directly impacted by disposal activities.

(c) Other Considerations (1 through 7)

- (1) Appropriate scientific literature has been incorporated in the project design to insure minimal impacts at both the dredging and disposal sites.
- (2) Alternatives to open water disposal, such as upland or confined disposal, were considered and found to be either environmentally unacceptable or economically unjustifiable.
- (3) Sediments at the site of the dive survey are predominantly clays and silts indicating the area is a containment site where dredged material would not be subject to wind or near shore current and wave activity.
- (4) Disposal seaward of the baseline of territorial seas is economically unjustified and may be environmentally unsound.
- (5) Dredged material falls into Class II sediment type using criteria put forth in the New York - Connecticut Interim Plan for the Disposal of Dredged Material in Long Island Sound. Class II materials do not require capping with cleaner sediments.
- (6) Not applicable. Disposal activities will not occur in a confined area.
- (7) Because of the relatively small amount of material involved, the designation of Wellfleet Harbor sediments as Class II (except for Vanadium) and surveys in the area where disposal will occur indicating the site is a containment area, monitoring of disposal activities is deemed unnecessary.

(d) Contaminated Fill Material Restrictions

Not applicable. The proposed project does not involve use of fill material.

(e) Mixing Zone Determinations

- (1) Massachusetts Coastal Zone Management has designated two interim sites in Cape Cod Bay for the disposal of Wellfleet sediments. Both of these areas are one square mile with center points located at:

70°15.9' Longitude  
41°55.4' Latitude and

70°13.3' Longitude  
41°54.4' Latitude

This area of Cape Cod Bay is more than large enough to receive the 70,000 c.y. of dredged material from Wellfleet Harbor.

- (2) No site-specific data on current velocity, direction or consistency is available at this time. A survey of the area has confirmed published reports that the substrate is predominantly silts and clay, indicating the area deeper than the 90 foot contour line is suitable for containment. However, dredged material does have a high fluid content and some portion of it may be dispersed by currents at the site.
- (3) Disposal activities will temporarily increase turbidity levels at the disposal site. This is expected to be temporary, with natural background levels returning shortly after disposal activities cease.
- (4) Stratification of dredged material should not occur to any significant degree since sediments throughout the Federal project are basically similar in grain size and other characteristics.
- (5) Since neither of the proposed disposal sites have been permanently designated as regional open water disposal sites, onsite studies or mathematical models with respect to mixing patterns at the discharge site have not been developed.
- (6) Factors that might affect rates and patterns of mixing at the disposal site have not been investigated.